



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

mk

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,002	08/04/2000	Keiji Ishibashi		2248
832	7590	03/04/2004		
BAKER & DANIELS 111 E. WAYNE STREET SUITE 800 FORT WAYNE, IN 46802			EXAMINER MARKHAM, WESLEY D	
			ART UNIT 1762	PAPER NUMBER

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/633,002	ISHIBASHI, KEIJI	
	Examiner	Art Unit	
	Wesley D Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-16 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-16 and 27-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application on 2/9/2004 (with a certificate of mailing dated 2/5/2004) after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office Action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/9/2004 has been entered.

Response to Amendment

2. Acknowledgement is made of the amendment filed by the applicant on 2/9/2004, in which Claims 11 and 27 were amended. Claims 11 – 16 and 27 – 32 are currently pending in U.S. Application Serial No. 09/633,002, and an Office Action on the merits follows. The examiner notes that Claims 17 – 20 are listed by the applicant as “withdrawn” in the **Listing of Claims:** section of the amendment filed on 2/9/2004. However, Claims 17 – 20 are canceled (i.e., pursuant to applicant’s previous amendment B), not withdrawn, and the applicant is suggested to make the appropriate correction in any subsequently filed responses.

Drawings

3. The formal drawings (2 sheets, 3 figures) filed on 8/4/2000 are approved by the examiner.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The rejection of Claims 11 – 14 and 27 – 30 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement for containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, set forth in paragraphs 6 – 7 of the previous Office Action (i.e., the final Office Action, mailed on 6/17/2003), is withdrawn in light of the applicant's amendment in which independent Claims 11 (from which Claims 12 – 14 depend) and 27 (from which Claims 28 – 30 depend) were amended to more narrowly require that the cleaning gas contain at least one of a fluorine atom and a chlorine atom (i.e., as opposed to a halogen atom in general).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 11, 12, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bluck et al. (USPN 6,101,972) in view of Dietz et al. (USPN 4,452,642), Matsuyama (USPN 5,149,375), and Hatakeyama et al. (USPN 5,216,241).
8. Regarding independent **Claims 11 and 27**, Bluck teaches a method for removing a deposited film from a wall inside a chamber (Col.4, lines 40 – 46), the method comprising providing a “hot element” (i.e., filaments “32” and “42”) in the chamber, the hot element disposed away from the wall of the chamber and the deposited film (Figure 2 and Col.6, lines 31 – 49), exhausting the chamber (Col.4, lines 48 – 55 and Col.6, lines 59 – 63), heating the hot element (Col.6, lines 38 – 39), supplying a cleaning gas into the chamber and first contacting the hot element with the gas to thereby activate the gas (i.e., generate an activated species therefrom) (Figure 2, reference numbers “32”, “42”, and “54”, Col.6, lines 32 – 67, and Col.7, lines 1 – 6), and contacting the deposited film with the activated cleaning gas to clean the walls of the chamber (Col.4, lines 40 – 46, Col.6, lines 57 – 67, and Col.7, lines 1 – 6). The cleaning gas of Bluck can comprise fluorocarbons or chlorine-containing gases

Art Unit: 1762

(Col.4, lines 6 – 46 of Bluck, which teaches chlorine-containing and fluorocarbon etching gases for cleaning chamber walls). Bluck does not explicitly teach that (1) the hot filaments have at least a surface which comprises platinum, (2) the hot filaments are heated to a temperature of 400° C or higher, and (3) the cleaning process involves converting the deposited film into a gaseous substance which is subsequently removed from the chamber. Regarding issues (1) and (2), Bluck is silent with respect to the composition of the hot filaments and the temperature to which the filaments are heated. However, it is clear that the filaments are heated (Col.6, lines 38 – 41) and that the filaments should be capable of activating the etching / cleaning gases taught by Bluck (i.e., argon, fluorocarbons, chlorine-containing gases, hydrogen, and/or oxygen (Col.4, lines 38 – 46, Col.6, lines 50 – 67, and Col.7, lines 1 – 6). Dietz teaches that, when utilizing a hot filament to activate a cleaning gas such as hydrogen in order to subsequently clean the walls of a chamber, platinum is a suitable material for the filament, and the filament should be heated to a temperature above 1300° C to activate the cleaning gas (Col.3, lines 1 – 11). Further, Dietz teaches that, “at higher temperatures, the degree of dissociation (i.e., of the cleaning gas) was substantially higher” (Col.3, lines 10 – 11). In other words, Dietz teaches that the temperature of the filament is a result / effective variable that determines the degree of dissociation / activation of the cleaning gas. Matsuyama teaches that, in the art of using hot filaments to activate process gases, platinum is a desirable filament material in view of heat resistance and reaction resistance (Col.9, lines 5 – 16). In addition, Matsuyama teaches that

Art Unit: 1762

the temperature of the filament is selected by taking into consideration the reactivity of the filament with various kinds of process gases and the heat resistance of the filament. Generally, the temperature is selected within a range of 800° C to 2000° C (i.e., above 400° C) (Col.9, lines 33 – 37). Hatakeyama et al. teaches that, in order to activate a highly-reactive gas such as a gas containing either a halogen or a halide (i.e., gases such as the fluorocarbon and chlorine containing cleaning gases taught by Bluck) by contacting the gas with a hot filament, the hot filament should be made of platinum, which is an inert metal, so that the filament does not deteriorate or become disconnected due to reaction with the gas (Col.3, lines 21 – 26, 34 – 37, and 60 – 66; Col.4, lines 1 – 10). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a platinum filament as the filament in the process of Bluck with the reasonable expectation of successfully and advantageously using a filament material that has high heat and reaction resistance (as taught by Matsuyama) and will not deteriorate, even when heated to a high temperature and contacted with a highly-reactive halogen containing gas (as taught by Hatakeyama et al.). This platinum filament property (i.e., high reaction resistance) would be especially advantageous in situations in which highly-reactive cleaning gases such as fluorocarbons and chlorine containing gases are used to etch / clean the walls of the chamber of Bluck. Further, it would have been obvious to one of ordinary skill in the art to heat the filament of Bluck to a temperature of, for example, above 800° C (i.e., above 400° C as claimed by the applicant) with the reasonable expectation of using a filament temperature that is capable of successfully activating the cleaning

Art Unit: 1762

gas of Bluck. The exact temperature of the filament would have been optimized by one of ordinary skill in the art as a result / effective variable through routine experimentation depending on the desired activation level for the cleaning gas (i.e., higher temperature leads to higher activation), the specific cleaning gas used, and the reactivity and heat resistance of the filament. Regarding issue (3), Bluck does teach that films such as DLC are deposited on the walls of the chamber and that etching with hot filament-activated gases can be used to clean the walls of the chamber (Col.4, lines 6 – 46). Dietz teaches that, when utilizing a hot filament to activate a cleaning gas in order to subsequently clean the walls of a chamber, surface contaminants such as carbon react with the cleaning gas to form a gaseous substance that is subsequently exhausted / removed from the chamber (Col.2, lines 39 – 62, and Col.3, lines 26 – 40). As such, the cleaning process of Bluck would have inherently converted at least a portion of the film deposited on the walls of the chamber into a gaseous substance (i.e., based on the inherent chemical reaction that occurs between the cleaning gas and the contaminants such as DLC on the chamber walls in the process of the combination of Bluck, Dietz, Matsuyama, and Hatakeyama et al.). Further, it would have been obvious to one of ordinary skill in the art to remove the gaseous substance from the chamber by exhausting the chamber as taught by Dietz with the reasonable expectation of (1) success, as the chamber of Bluck is clearly capable of being exhausted (Col.6, lines 59 – 63), and (2) obtaining the advantages of removing the undesirable contaminants in gaseous form from the chamber, such as preventing the gaseous material from building up in

Art Unit: 1762

the chamber and re-depositing, thereby contaminating the chamber and the substrate therein. Regarding **Claims 12 and 28**, the combination of Bluck, Dietz, Matsuyama, and Hatakeyama et al. also teaches that the chamber comprises a CVD apparatus and the method further comprises heating the hot element, supplying a material gas to the chamber, contacting the material gas with the hot element to cause decomposition and/or activation of the material gas by the hot element, and forming a deposited film which comprises at least one element from the material gas on a substrate (Figure 2, Col.1, lines 9 – 14, Col.6, lines 32 – 67, and Col.7, lines 1 – 6 of Bluck et al.).

9. Claims 13, 14, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bluck et al. (USPN 6,101,972) in view of Dietz et al. (USPN 4,452,642), Matsuyama (USPN 5,149,375), and Hatakeyama et al. (USPN 5,216,241), and in further view of Iwasaki et al. (JP 03-226578 A).
10. The combination of Bluck, Dietz, Matsuyama, and Hatakeyama et al. teaches all the limitations of **Claims 13, 14, 29, and 30** as set forth above in paragraph 8, except for a method wherein at least part of a surface of an inner structure of the chamber is covered with platinum. However, Bluck does teach cleaning the chamber walls with fluorocarbons (i.e., fluorine-based gaseous etchants) (Col.4, lines 37 – 46). Iwasaki teaches that, in order to improve the corrosion resistance of a device in which both deposition and etching take place (i.e., a device such as the one taught by Bluck), the inner surface of the chamber can be coated with a protective layer of platinum so

Art Unit: 1762

that, even if the inside of the device is cleaned with a fluorine-based gaseous etchant, the internal surfaces are not corroded and the device can be used over a long period of time (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art to cover the inner surfaces of the chamber of Bluck with platinum as taught by Iwasaki with the reasonable expectation of successfully and advantageously protecting the inside of the chamber from corrosion by the fluorine-based gaseous etchants of Bluck, thereby increasing the useful life of the chamber.

11. Claims 15, 16, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bluck et al. (USPN 6,101,972) in view of Dietz et al. (USPN 4,452,642), Matsuyama (USPN 5,149,375), and Hatakeyama et al. (USPN 5,216,241), and in further view of Hatano et al. (USPN 5,709,757).
12. The combination of Bluck, Dietz, Matsuyama, and Hatakeyama et al. teaches all the limitations of **Claims 15, 16, 31, and 32** as set forth above in paragraph 8, except for a method wherein the cleaning gas contains at least one of cleaning gases recited by the applicant in Claims 15, 16, 31, and 32. However, Bluck does teach fluorocarbons and chlorine-containing cleaning gases in general (Col.4, lines 44 – 45). Hatano teaches that the cleaning gases claimed by the applicant such as Cl_2 , ClF_3 , and NF_3 were known as chamber-wall cleaning gases at the time of the applicant's invention (Col.1, lines 19 – 41, and Col.6, lines 1 – 14). Therefore, it would have been obvious to one of ordinary skill in the art to utilize the cleaning gases taught by Hatano as the cleaning gas in the process of the combination of

Bluck, Dietz, Matsuyama, and Hatakeyama et al. with the reasonable expectation of successfully using a well-known, specific cleaning gas out of the broader genus of chlorine- and fluorine-containing cleaning gases taught by Bluck (i.e., selecting a known species out of a broader disclosed genus).

13. Claims 11, 12, 15, and 16 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Yamanaka et al. (USPN 6,592,771 B1).

14. Regarding independent **Claim 11**, Yamanaka et al. teaches a method for etching

(i.e., "removing") a deposited film inside a chamber (Abstract, Figures 1 – 3, Col.10,

lines 27 – 67, and Col.11, lines 1 – 7), the method comprising providing a hot

element "46" in the chamber, the hot element disposed away from the deposited film

and having at least a surface which comprises platinum (Figures 1 – 3, Col.5, lines

48 – 60, Col.7, lines 20 – 34, and Col.10, lines 46 – 55), exhausting the chamber

(Figures 1 – 3, Col.10, lines 56 – 58, and Col.11, lines 53 – 62), heating the hot

element to 400° C or higher (Col.10, lines 46 – 50 and 62 – 63), supplying into the

chamber a cleaning gas containing at least one of a fluorine atom and a chlorine

atom (Col.6, lines 61 – 65, Col.10, lines 59 – 67), contacting the cleaning gas with

the heated hot element to decompose and/or activate the cleaning gas and generate

an activated species therefrom (Col.5, lines 61 – 65, Col.10, lines 66 – 67, and

Col.11, lines 1 – 8), and allowing the activated species to etch the deposited film

(Col.5, lines 55 – 65, and Col.11, lines 1 – 24). Yamanaka et al. does not explicitly

teach that the etching of the deposited film converts the film into a gaseous

substance that is removed from the chamber. However, Yamanaka et al. does teach etching films such as silicon with a reaction gas such as CF₄ that has been previously activated by contacting the gas with a platinum hot filament (Col.10, lines 56 – 65, Col.11, lines 1 – 8, and Col.12, lines 40 – 67). This etching process would have inherently converted portions of the silicon film into a gaseous substance due to a chemical reaction that takes place between a gas such as CF₄ and a deposited silicon film (see, for example, pages 8 – 9 of the applicant's specification, which shows that an activated cleaning gas such as CF₄ reacts with silicon films to convert the films into gaseous substances). Additionally, it is clear that Yamanaka et al. does not desire contaminants to remain in the chamber after the etching process (Col.12, lines 26 – 30), and the chamber of Yamanaka et al. can clearly be exhausted (Figures 1 – 2, Col.10, lines 56 – 58, and Col.11, lines 53 – 62). Therefore, it would have been obvious to one of ordinary skill in the art to remove the gaseous substance from the chamber of Yamanaka et al. by exhausting the chamber with the reasonable expectation of (1) success, as the chamber of Yamanaka et al. is clearly capable of being exhausted, and (2) obtaining the advantages of removing undesirable contaminants in gaseous form from the chamber, such as reducing the amount of gaseous material that builds-up in the chamber and re-deposits, thereby contaminating the chamber and/or the substrate therein. Regarding **Claim 12**, Yamanaka et al. also teaches that the chamber comprises a CVD apparatus and the method further comprises heating the hot element, supplying a material gas to the chamber, contacting the material gas with the hot element to cause decomposition

Art Unit: 1762

and/or activation of the material gas by the hot element, and forming a deposited film which comprises at least one element from the material gas on a substrate (Figures 1 – 3, Col.12, lines 40 – 67). Regarding **Claims 15 and 16**, Yamanaka et al. also teaches that the etching (i.e., cleaning) gas is, for example, CF_4 (Col.10, lines 59 – 65).

15. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka et al. (USPN 6,592,771 B1) in view of Iwasaki et al. (JP 03-226578 A).

16. Yamanaka et al. teaches all the limitations of **Claims 13 and 14** as set forth above in paragraph 14, except for a method wherein at least part of a surface of an inner structure of the chamber is covered with platinum. However, Yamanaka et al. does teach cleaning the chamber walls with fluorine-containing gases such as CF_4 , C_2F_6 , and NF_3 (Col.12, lines 15 – 39). Iwasaki teaches that, in order to improve the corrosion resistance of a device in which both deposition and etching take place (i.e., a device such as the one taught by Yamanaka et al.), the inner surface of the chamber can be coated with a protective layer of platinum so that, even if the inside of the device is cleaned with a fluorine-based gaseous etchant, the internal surfaces are not corroded and the device can be used over a long period of time (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art to cover the inner surfaces of the chamber of Yamanaka et al. with platinum as taught by Iwasaki with the reasonable expectation of successfully and advantageously protecting the

inside of the chamber from corrosion by the fluorine-based cleaning gases of Yamanaka et al., thereby increasing the useful life of the chamber.

17. Applicant cannot rely upon the foreign priority papers to overcome the above rejections based on Yamanaka et al. because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Response to Arguments

18. Applicant's arguments filed on 2/9/2004 have been fully considered but they are not persuasive.

19. First and regarding the 35 U.S.C. 103(a) rejection of Claims 11, 12, 27, and 28 based on Bluck et al. in view of Dietz et al. and Matsuyama, the applicant argues that Bluck et al. does not correct the shortcomings of Dietz et al. Specifically, the applicant argues that, in the Dietz et al. method, hydrogen gas which will not react with the heating element is used as the cleaning gas, as opposed to the instant invention which uses a very corrosive gas. The applicant then states that Matsuyama teaches activating gases for depositing a film within a chamber rather than removing a deposited film with an activated gas, thereby teaching away from the applicant's invention. In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800

Art Unit: 1762

F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Further, the examiner notes that Bluck et al. does teach chlorine-containing and fluorocarbon etching gases for cleaning chamber walls/components (Col.4, lines 6 – 46). Regarding the Matsuyama reference, the examiner has not argued or stated that Matsuyama teaches removing a deposited film by activating cleaning gases with a hot element – this limitation is taught by Bluck et al. Matsuyama has been cited by the examiner to show that platinum is a desirable material to use as a hot filament to activate process gases because of its heat and reaction resistance. A platinum hot filament would possess these desirable qualities regardless of whether the filament is utilized to activate deposition gases or to activate etching gases. Additionally and regarding the Matsuyama reference, in certain embodiments, the applicant's claims require activating gases for depositing a film within a chamber (see, for example, Claims 12 and 28); therefore, Matsuyama clearly does not “teach away” from the applicant's claimed invention.

20. Second, the applicant notes that the specific examples provided by Matsuyama describe using a tungsten filament to activate gases such as Si_2F_6 and GeF_4 (Example 5), while the applicant believes that tungsten is not suitable in a situation where a gas containing a fluorine or chlorine atom is used. The applicant then states that Matsuyama would not have recognized that a platinum filament is not etched and is stable when used with such a cleaning gas. In response, the above arguments are simply speculation on the part of the applicant. There is no evidence on the record to suggest that one of ordinary skill in the art, at the time of the

applicant's invention, would have expected a platinum hot filament not to function successfully in activating fluorine- or chlorine-containing cleaning gases. In fact, the newly-cited Hatakeyama et al. reference explicitly teaches that platinum is an inert material and should be used for a hot filament that contacts highly-reactive halogen-containing gas so that the filament is not deteriorated. This teaching directly contradicts the applicant's argument. Additionally, Bluck et al. teaches using a hot-filament in general to activate gases such as argon, fluorocarbons, chlorine-containing gases, hydrogen, and/or oxygen in order to clean/etch the walls of a reaction chamber (Col.4, lines 6 – 46, Col.6, lines 32 – 67, and Col.7, lines 1 – 6). Since Bluck et al. is silent as to the material used to form the hot-filament, one of ordinary skill in the art would have been motivated to seek out an appropriate material for this purpose. Dietz et al. teaches that platinum is a suitable material for a hot-filament that is used to activate cleaning gases, Matsuyama teaches that platinum is a desirable material to use as a hot-filament to activate process gases because of its heat and reaction resistance, and Hatakeyama et al. teaches that a platinum hot filament is not deteriorated by a reactive halogen-containing gas. Therefore, one of ordinary skill in the art would have clearly had (1) a reasonable expectation of success in choosing a platinum hot-filament to activate chlorine-containing and/or fluorocarbon cleaning gases, and (2) a motivation to choose platinum as the hot-filament material due to its heat and reaction resistance, as taught by Matsuyama and Hatakeyama et al.

Art Unit: 1762

21. Third, the applicant argues that, even if the cited references could be combined, the resulting structure would not render obvious the applicant's claimed invention. In response, the examiner disagrees. Specifically, the combination(s) of references cited by the examiner reasonably suggest each and every limitation of the applicant's claims (see the discussion of the 35 U.S.C. 103(a) rejections set forth above).

22. Fourth, the declaration under 37 CFR 1.132 filed on 11/18/2003 is insufficient to overcome the rejection of Claims 11 – 16 and 27 – 32 because of the following. The aforementioned declaration contains two exhibits: (1) a Japanese language document entitled "Examination of Cat-CVD in-situ cleaning" prepared by Keiji Ishibashi, and (2) a certified English language translation of the aforementioned document. In regards to this document, the applicant argues that, while it was generally known to those skilled in the art that the reaction rate of a wire with a cleaning gas increases as temperature rises, the experimental data indicated to the inventor that when a hot element is heated to a (threshold) temperature or higher, the wire is prevented from being etched, thereby extending its life, which contrary to what one skilled in the art would have anticipated. The applicant then surmises that the same is true for a platinum wire heated to the advantageously low threshold temperature of 400° C or higher and states that a person skilled in the art would have avoided heating a platinum wire to a high temperature in the cleaning gas atmosphere since he would have expected, based on the Ishibashi document, that the platinum wire would be broken in a short time. In response and after careful

consideration of the Ishibashi document / declaration, the examiner notes that the only data provided in the document deals with the etching rate of a tungsten wire in an NF_3 atmosphere at temperatures of about 2000°C and about 2500°C . While this data does support the conclusion that a tungsten wire is etched to a lesser degree by NF_3 at a temperature of 2500°C than 2000°C , the extrapolation of this data to infer the behavior of a platinum wire (as claimed by the applicant) is merely supposition. There is no data indicating whether or not a platinum wire has a "threshold temperature", and if it does, what this "threshold temperature" is. The Ishibashi document / declaration is entirely drawn to a tungsten filament, not a platinum filament, and therefore, the data provided in the document is not particularly relevant to the claimed process. Regarding the applicant's statement that a person skilled in the art would have avoided heating a platinum wire to a high temperature in the cleaning gas atmosphere since he would have expected that the platinum wire would be broken in a short time, this statement is not supported by the prior art of record (e.g., Dietz et al.'s teaching that platinum is a suitable material for a hot-filament that is used to activate cleaning gases, Matsuyama's teaching that platinum is a desirable material to use as a hot-filament to activate process gases because of its heat and reaction resistance, and Hatakeyama et al.'s teaching that a high-temperature platinum filament does not deteriorate when contacting highly-reactive halogen containing gases).

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


WDM

Wesley D Markham
Examiner
Art Unit 1762


SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700